GENERA OF MESOAMERICAN PANICEAE (POACEAE: PANICOIDEAE)

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ABSTRACT

A taxonomic study of generic concepts and evaluation of characters is presented for the Paniceae of Mesoamerica. An original set of data, consisting of 305 characters recorded for 37 genera, were collected and analyzed to produce English and Spanish bracketed keys to the recognized genera. An appropriate subset of characters was selected for inclusión in a Spanish synoptic key. These characters are also presented in a set of comparative English descriptions for the genera not occurring in North América. Diagnostic characters essential for identification are highlighted within each description. Remarks on the morphology and relationships of each genus are also given.

RESUMEN

Se presenta un estudio taxonómico de evaluación de caracteres y conceptos a nivel género para las Paniceae de Mesoamérica. Un conjunto particular de datos, consistente en 305 caracteres se registró para 37 géneros, éstos fueron reunidos y analizados para producir claves dicotómicas en inglés y español para los géneros reconocidos. Un subconjunto adecuado de caracteres fue seleccionado para elaborar una clave sinóptica en español. Estos caracteres están también presentados en un grupo de descripciónes comparativas en inglés para los géneros que no se distribuyen en Norteamérica. Caracteres diagnósticos escenciales para la identificaci"n están resaltados en cada descripci"n. Observaciones sobre la morfolog!a y relaciones de cada género son también presentados.

INTRODUCTION

This paper is the third in a series of studies designed to give a detailed account of the variation, generic concepts, and relationships among the genera of the Paniceae. These studies will conclude in a phenetic and cladistic analysis of the ca. 100 recognized genera of this tribe, which will be used as a basis for an evaluation of the classification of the group on a worldwide basis. Webster (1987) presented a reappraisal of the 45 genera

SIDA 13(2):187 – 221. 1988.

of the Paniceae occurring in Australia. Webster (1988) provided a general taxonomic review of generic concepts for the North American (north of Mexico) genera of the Paniceae, gave a brief history to the taxonomy of the group, and discussed the methods employed and concepts of characters and character states. In that study, certain computer software (Dallwitz 1974 & 1980; Pankhurst & Aitchison 1975), which directly or indirectly read and analyze DELTA format, was applied in the production of a bracketed key, synoptic key, and a set of comparative descriptions for the 25 recognized genera. The introduction, methods, terminology, and character concepts explained in Webster (1988) are directly applicable to the present study and need not be repeated; however, it seems important to provide an elaboration of the methods most relevant to the present study.

The objective of this study is to present a taxonomic account of the genera of the Paniceae occurring in Mesoamerica (Mexico, Central América, and the West Indies). An ordered sequence of 305 characters was compiled accounting for variation in the Paniceae. This represents a major modification and reordering of the characters used in Webster (1988). Data for these characters were recorded for the 38 recognized genera based on observations of representative specimens of species in each genus. The data were analyzed by the key generating program, KEY, to produce a bracketed key which satisfied our concepts of character importance and key design, and fulfilled the programs requirements of efficiency and correctness. The same data and procedures were used to produce a bracketed key in Spanish. Our concepts of the taxonomic reliability for each character used in the production of the keys were incorporated in an ONLINE information retrieval analysis for the selection of an appropriate subset of characters for inclusión in the descriptions and synoptic key. A synoptic key, also in Spanish, is presented here and includes an alphabetic list of the numbered genera and a list of the 57 characters selected in the ONLINE analysis. Each character listed in the synoptic key consists of a feature followed by its character states as defined in the character file and ONLINE conversion. After each character state the genera exhibiting that state are indicated by their associated numbers. Character weights or reliabilities (9 being the highest and 5 the lowest) are also indicated in parenthesis following each feature. For example, character 1 (plants annual or perennial) was given a relative weight of "7" in the production of the bracketed keys and selection of characters for the synoptic key and descriptions. Descriptions, incorporating the 57 characters selected in the ONLINE analysis, were produced via CONFOR for the genera not covered in Webster (1988). Associated with each description are pertinent nomenclatural information and remarks on the morphology and relationships of the genus.

English key to the Mesoamerican genera of the Paniceae

1(0). Disarticulation above the lower glume or at the spikelet base . . . 2
Disarticulation at the base of the primary branches or at the nodes of the primary branches 51
2(1). Rachis terminating in a spikelet 3
Rachis terminating in an unmodified naked point or terminating in a bristle. 46
3(2). Inflorescence a panicle 4
Inflorescence a raceme 43
4(3). Lower lemma with a central longitudinal groove . . . . . *Thrasya*
Lower lemma lacking a central longitudinal groove 5
5(4). Primary branches with appressed secondary branches or reduced to a fascicle of spikelets 6
Primary branches with spreading secondary branches. 29
6(5). Lemma of upper floret with flat margins 7
Lemma of upper floret with involute margins 18
7(6). Second glume saccate or gibbose 8
Second glume neither saccate nor gibbose 9
8(7). Lemma of lower floret with a hyaline area at the base; spikelets laterally compressed; second glume indumentum uncinate; internodes solid or spongy . . . . . *Pseudechinolaena*
Lemma of lower floret consistent in texture; spikelets dorsiventrally compressed or planoconvex; second glume indumentum not uncinate; internodes hollow . . . . . *Sacciolepis*
9(7). Primary branches with secund or distichous spikelets 10
Primary branches with spikelets neither secund nor distichous . . 17
10(9). Ligule a membrane or a ciliate membrane 11
Ligule a fringe of hairs 14
11(10). First glume present 12
First glume absent 13
12(11). Spikelets adaxial; internodes solid or spongy; first glume encircling the spikelet base; lemma of upper floret with margins of the same texture as the body . . . . . *Hymenachne*
Spikelets abaxial; internodes hollow; first glume not encircling the spikelet base; lemma of upper floret with margins thinner in texture than the body . . . . . *Digitaria*
13(11). Spikelets adaxial . . . . . *Axonopus*
Spikelets abaxial . . . . . *Digitaria*
14(10). First glume present; primary branches with loosely arranged spikelets 15
First glume absent; primary branches with closely arranged spikelet . . . . . *Axonopus*
15(14). First glume muticous; first glume encircling the spikelet base; second glume muticous . . . . . *Scutachne*
First glume awned; first glume not encircling the spikelet base; second glume awned 16
16(15). Spikelets laterally compressed; lemma of upper floret hyaline to membranous; stamens 2; callus not differentiated . . . . . *Reynaudia*

Spikelets dorsiventrally compressed; lemma of upper floret cartilaginous; stamens 3; callus differentiated ..... *Chaetium*

17(9). First glume muticous; spikelets dorsiventrally compressed; main axis with distichous primary branches; pedicels truncate; second glume muticous ..... *Triscenia*

First glume awned; spikelets laterally compressed; main axis with quaquaversal primary branches; pedicels discoid; second glume awned ..... *Arthropogon*

18(6). Lemma of upper floret differentiated at the apex 19

Lemma of upper floret not differentiated at the apex 20

19(18). Internodes solid or spongy; leaf blades with an incised base; pedicels discoid; upper lemma becoming membranous at the apex ..... *Echinochloa*

Internodes hollow; leaf blades truncate to rounded at the base; pedicels truncate; upper lemma conduplicate at the apex ..... *Acroceras*

20(18). Lemma of upper floret smooth, scabrous, striate, pitted, or papillate 21

Lemma of upper floret rugose 28

21(20). Lemma of upper floret with basal scars or appendages; rachilla pronounced between the florets 22

Lemma of upper floret without basal modifications; rachilla not pronounced between the florets 23

22(21). Spikelets pectinate or tightly spaced on the primary branches; first glume with bulbose-based setaceous hairs; pedicels discoid; pedicels flat to convex at the apex ..... *Echinolaena*

Spikelets neither pectinate nor distinctly tightly spaced on the primary branches; first glume lacking bulbose-based setaceous hairs; pedicels cupuliform; pedicels concave at the apex ..... *Ichnanthus*

23(21). First glume present and awned ..... *Oplismenus*

First glume present or absent but not awned 24

24(23). Pedicels concave at the apex; spikelets adaxial 25

Pedicels flat or convex at the apex; spikelets abaxial ..... *Paspalum*

25(24). Ligule a membrane or a ciliate membrane 26

Ligule a fringe of hairs 27

26(25). First glume present ..... *Panicum*

First glume absent ..... *Axonopus*

27(25). First glume present; internodes hollow; main axis with distichous or secund primary branches ..... *Brachiaria*

First glume absent; internodes solid or spongy; main axis with quaquaversal primary branches ..... *Axonopus*

28(20). First glume fused with the callus to form a cuplike structure ..... *Eriochloa*

First glume not fused with the callus ..... *Urochloa*

29(5). Lemma of upper floret with flat margins 30

Lemma of upper floret with involute margins 39

30(29). Primary branches with secund or distichous spikelets 31

Primary branches with spikelets neither secund nor distichous .. 35

31(30). First glume muticous 32

First glume awned 34

32(31). Ligule a membrane or a ciliate membrane 33

Ligule a fringe of hairs ..... *Scutachne*

33(32). Spikelets laterally compressed; rachilla pronounced between the florets; second glume indumentum uncinate; lemma of lower floret with a hyaline area at the base ..... *Pseudechinolaena*
Spikelets planoconvex; rachilla not pronounced between the florets; second glume indumentum not uncinate; lemma of lower floret consistent in texture ..... *Digitaria*
34(31). Ligule a membrane; rachilla pronounced between the florets; second glume gibbose; second glume indumentum uncinate; lemma of lower floret with a hyaline area at the base ..... *Pseudechinolaena*
Ligule a fringe of hairs; rachilla not pronounced between the florets; second glume neither saccate nor gibbose; second glume indumentum not uncinate; lemma of lower floret consistent in texture ..... *Reynaudia*
35(30). First glume present; sheaths rounded 36
First glume absent; sheaths laterally compressed ..... *Anthaenantia*
36(35). First glume muticous; second glume less than or equal to the length of the lower floret 37
First glume awned; second glume greater than the length of the lower floret ..... *Arthropogon*
37(36). Ligule a membrane; spikelets dorsiventrally compressed; lemma of upper floret with margins thinner in texture than the body ..... *Homolepis*
Ligule a fringe of hairs; spikelets laterally compressed; lemma of upper floret with margins of the same texture as the body 38
38(37). Second glume 5-nerved; main axis with distichous primary branches; internodes neither viscid nor glaucous ..... *Rhynchelytrum*
Second glume 7-nerved; main axis with quaquaversal primary branches; internodes viscid ..... *Melinis*
39(29). Rachilla pronounced between the florets 40
Rachilla not pronounced between the florets 41
40(39). Rachilla with lateral appendages; primary branches with secund spikelets; lemma of upper floret with basal scars or appendages; spikelets adaxial; first glume encircling the spikelet base ..... *Ichnanthus*
Rachilla lacking lateral appendages; primary branches with spikelets neither secund nor distichous; lemma of upper floret without basal modifications; spikelets abaxial; first glume not encircling the spikelet base ..... *Isachne*
41(39). Spikelets dorsiventrally compressed or planoconvex; lemma of upper floret not differentiated at the apex; spikelets not divergent from the axis; first glume not inflated at the base 42
Spikelets terete; lemma of upper floret differentiated at the apex; spikelets divergent from the axis; first glume inflated at the base ... *Lasiacis*
42(41). Ligule a membrane or a ciliate membrane; lemma of upper floret smooth, striate, or papillate; pedicels cupuliform ..... *Panicum*
Ligule a fringe of hairs; lemma of upper floret rugose; pedicels discoid ..... *Urochloa*
43(3). Lower lemma with a central longitudinal groove; pedicels flat or convex at the apex; lemma of upper floret with involute margins ..... *Thrasya*
Lower lemma lacking a central longitudinal groove; pedicels concave at the apex; lemma of upper floret with flat margins..... 44

44(43). Lemma of upper floret with basal scars or appendages; pedicels flat to convex at the apex ..... *Echinolaena*
Lemma of upper floret lacking basal scars or appendages; pedicels concave at the apex 45
45(44). Lemma of lower floret with the area between the central nerve and the first lateral nerve thinner in texture than the rest of the structure; pedicels oblique to the spikelet base; main axis with distichous primary branches; second glume muticous ..... *Mesosetum*
Lemma of lower floret consistent in texture; pedicels perpendicular with the spikelet base; main axis with quaquaversal primary branches; second glume awned ..... *Arthropogon*
46(2). Lower lemma with a central longitudinal groove; spikelets adaxial; main axis winged ..... *Thrasya*
Lower lemma lacking a central longitudinal groove; spikelets abaxial; main axis not winged 47
47(46). Lemma of lower floret with a hyaline area at the base; second glume chartaceous to indurate; second glume 13 – 23-nerved ..... *Setariopsis*
Lemma of lower floret consistent in texture; second glume hyaline to membranous; second glume less than 13-nerved 48
48(47). Palea of lower floret with nerves pronounced but not winged; bristles scabrous; lemma of lower floret not keeled 49
Palea of lower floret with nerves pronounced into obvious wings; bristles smooth; lemma of lower floret keeled ..... *Ixophorus*
49(48). Pedicels concave at the apex; lemma of upper floret rugose; first glume encircling the spikelet base 50
Pedicels flat or convex at the apex; lemma of upper floret smooth, striate, or papillate; first glume not encircling the spikelet base ..... *Paspalum*
50(49). Main axis with distichous primary branches ..... *Paspalidium*
Main axis with quaquaversal primary branches ..... *Setaria*
51(1). Second glume present; stamens 3; inflorescence linear or oblong ... 52
Second glume absent; stamens 2; inflorescence lanceolate or ovate .. *Reimarochloa*
52(51). Second glume more than 0.1 times spikelet length; pedicels with glabrous apices; cleistogamous inflorescence absent; lemma of upper floret dull 53
Second glume less than 0.1 times spikelet length; pedicels with hairy apices; cleistogamous inflorescence present; lemma of upper floret shiny ..... *Paratheria*
53(52). Fascicles with 1 – 6 spikelets; spikelets not obviously opposite a flared bract 54
Fascicles with 4 spikelets; spikelets opposite a flared bract ..... *Anthephora*
54(53). Disarticulation at the nodes of the main axis or at the base of the inflorescence; main axis with distichous or secund primary branches; leaf blades acute to rounded at the apex ..... *Stenotaphrum*
Disarticulation at the base of the primary branches; main axis with quaquaversal primary branches; leaf blades caudate to acuminate at the apex 55
55(54). Callus flared to form a discoid receptacle ..... *Cenchrus*
Callus not flared to form a discoid receptacle ..... *Pennisetum*

Spanish key to the Mesoamerican genera of the Paniceae

1(0). Desarticulación arriba de la gluma inferior o en la base de la espiguilla 2
Desarticulación en la base de la ramificación primaria o en los nudos de la ramificación primaria 51

2(1). Raquis terminando en una espiguilla 3
Raquis terminando en una punta desnuda no modificada o terminanda en una cerda 46

3(2). Inflorescencia una panícula 4
Inflorescencia un racimo 43

4(3). Lema inferior con una cavidad central longitudinal . . . . . *Thrasya*
Lema inferior sin una cavidad central longitudinal 5

5(4). Ramificaciones primarias con las ramificaciónes secundarias adpresas o reducidas a un fascículo de espiguillas 6
Ramificaciones primarias con las ramificaciónes secundarias abiertas 29

6(5). Lema del flósculo superior con márgenes planos 7
Lema del flósculo superior con márgenes involutos 18

7(6). Segunda gluma sacciforme o gibosa 8
Segunda gluma no sacciforme ni gibosa 9

8(7). Lema del flósculo inferior con un área hialina en la base; espiguillas comprimidas lateralmente; segunda gluma con indumento uncinado; entrenudos sólidos o esponjosos . . . . . *Pseudechinolaena*
Lema del flósculo inferior consistente en textura; espiguillas comprimidas dorsiventralmente o planoconvexas; segunda gluma con indumento no uncinado; entrenudos huecos . . . . . *Sacciolepis*

9(7). Ramificaciones primarias con espiguillas secundifloras o con espiguillas dísticas 10
Ramificaciones primarias con espiguillas ni secundifloras ni dísticas 17

10(9). Lígula una membrana o una membrana ciliada 11
Lígula una fimbria de pelos 14

11(10). Primera gluma presente 12
Primera gluma ausente 13

12(11). Espiguillas con orientacíon adaxial; entrenudos sólidos o esponjosos; primera gluma encerrando la base de la espiguilla; lema del flósculo superior con márgenes no más delgados en textura que el cuerpo . . . . . *Hymenachne*
Espiguillas con orientacíon abaxial; entrenudos huecos; primera gluma no encerrando la base de la espiguilla; lema del flósculo superior con márgenes más delgados en textura que el cuerpo . . . . . *Digitaria*

13(11). Espiguillas con orientacíon adaxial . . . . . *Axonopus*
Espiguillas con orientacíon abaxial . . . . . *Digitaria*

14(10). Primera gluma presente; ramificaciones primarias con espiguillas dispuestas laxamente 15
Primera gluma ausente; ramificaciones primarias con espiguillas dispuestas ordenadamente . . . . . *Axonopus*

15(14). Primera gluma mutica; primera gluma encerrando la base de la espiguilla; segunda gluma mutica . . . . . *Scutachne*
Primera gluma aristada; primera gluma no encerrando la base de la espiguilla; segunda gluma aristada 16
16(15). Espiguillas comprimidas lateralmente; lema del flósculo superior hialina a membranosa; estambres 2; callo no diferenciado . . . . . *Reynaudia*
Espiguillas comprimidas dorsiventralmente; lema del flósculo superior cartilaginosa; estambres 3; callo diferenciado . . . . . *Chaetium*
17(9). Primera gluma mutica; espiguillas comprimidas dorsiventralmente; eje principal con las ramificaciones primarias disticas; pedicelos truncados; segunda gluma mútica . . . . . *Triscenia*
Primera gluma aristada; espiguillas comprimidas lateralmente; eje principal con las ramificaciones primarias ni disticas ni secundifloras; pedicelos discoides; segunda gluma aristada . . . . . *Arthropogon*
18(6). Lema del flósculo superior diferenciada en el ápice 19
Lema del flósculo superior no diferenciada en el ápice 20
19(18). Entrenudos sólidos o esponjosos; limbos con una base incisa; pedicelos discoides; lema superior con el ápice membranoso . . . . . *Echinochloa*
Entrenudos huecos; limbos truncados a redondeados en la base; pedicelos truncados; lema superior con un ápice conduplicado . . . . . *Acroceras*
20(18). Lema del flósculo superior lisa, escabrosa, estriada, punteada, o papilosa 21
Lema del flósculo superior rugosa 28
21(20). Lema del flósculo superior con una cicatriz o ápendices basales; raquilla prolongándose entre los flósculos 22
Lema del flósculo superior sin modificaciones basales; raquilla no prolongándose entre los flósculos 23
22(21). Espiguillas densamente traslapadas (pectinadas); primera gluma con un indumento setoso; pedicelos discoides; pedicelos con depresion plana o convexa en el ápice . . . . . *Echinolaena*
Espiguillas escasamente traslapadas o distantes (ni pectinadas); sin un indumento setoso; pedicelos cupuliformes; pedicelos con depresion cóncava en el ápice . . . . . *Ichnanthus*
23(21). Primera gluma presente; primera gluma aristada . . . . . *Oplismenus*
Primera gluma presente o ausente; primera gluma mútica 24
24(23). Pedicelos con depresion cóncava en el ápice o con depresion plana en el ápice; espiguillas con orientacíon adaxial 25
Pedicelos con depresion convexa en el ápice; espiguillas con orientacíon abaxial . . . . . *Paspalum*
25(24). Lígula una membrana o una membrana ciliada 26
Lígula una fimbria de pelos 27
26(25). Primera gluma presente . . . . . *Panicum*
Primera gluma ausente . . . . . *Axonopus*
27(25). Primera gluma presente; entrenudos huecos; eje principal con las ramificaciones primarias dísticas o secundifloras . . . . . *Brachiaria*
Primera gluma ausente; entrenudos sólidos o esponjosos; eje principal con las ramificaciones primarias ni dísticas ni secundifloras . . . . . *Axonopus*
28(20). Primera gluma fusionada con el callo para formar un anillo hinchado . . . . . *Eriochloa*

Primera gluma no fusionada con el callo ..... *Urochloa*
29(5). Lema del flósculo superior con márgenes planos 30
Lema del flósculo superior con márgenes involutos 39
30(29). Ramificaciones primarias con espiguillas secundifloras o dísticas . 31
Ramificaciones primarias con espiguillas ni secundifloras ni dísticas 35
31(30). Primera gluma mutica 32
Primera gluma aristada 34
32(31). Ligula una membrana o una membrana ciliada 33
Ligula una fimbria de pelos ..... *Scutachne*
33(32). Espiguillas comprimidas lateralmente; raquilla prolongándose entre los flósculos; segunda gluma con indumento uncinado; lema del flósculo inferior con un área hialina en la base ..... *Pseudechinolaena*
Espiguillas planoconvexas; raquilla no prolongándose entre los flósculos; segunda gluma con indumento no uncinado; lema del flósculo inferior consistente en textura ..... *Digitaria*
34(31). Ligula una membrana; raquilla prolongándose entre los flósculos; segunda gluma gibosa; segunda gluma con indumento uncinado; lema del flósculo inferior con un área hialina en la base.... *Pseudechinolaena*
Ligula una fimbria de pelos; raquilla no prolongándose entre los flósculos; segunda gluma no sacciforme ni gibosa; segunda gluma con indumento no uncinado; lema del flósculo inferior consistente en textura ..... *Reynaudia*
35(30). Primera gluma presente; vainas redondeadas 36
Primera gluma ausente; vainas comprimidas lateralmente ..... *Anthaenantia*
36(35). Primera gluma mutica; segunda gluma hasta 1 vez la longitud del flósculo inferior 37
Primera gluma aristada; segunda gluma 1.1 veces la longitud del flósculo inferior o más ..... *Arthropogon*
37(36). Ligula una membrana; espiguillas comprimidas dorsiventralmente; lema del flósculo superior con márgenes más delgados en textura que el cuerpo ..... *Homolepis*
Ligula una fimbria de pelos; espiguillas comprimidas lateralmente; lema del flósculo superior con márgenes no más delgados en textura que el cuerpo 38
38(37). Segunda gluma 5-nervada; eje principal con las ramificaciones primarias dísticas; entrenudos no viscidos ..... *Rhynchelytrum*
Segunda gluma 7-nervada; eje principal con las ramificaciones primarias ni dísticas ni secundifloras; entrenudos viscidos ..... *Melinis*
39(29). Raquilla prolongándose entre los flósculos 40
Raquilla no prolongándose entre los flósculos 41
40(39). Raquilla con apéndices laterales; ramificaciones primarias con espiguillas secundifloras; lema del flósculo superior con una cicatriz o ápendices basales; espiguillas con orientacíon adaxial; primera gluma encerrando la base de la espiguilla ..... *Ichnanthus*
Raquilla sin apéndices laterales; ramificaciones primarias con espiguillas ni secundifloras ni dísticas; lema del flósculo superior sin modificaciones basales; espiguillas con orientacíon abaxial; primera gluma no encerrando la base de la espiguilla ..... *Isachne*

41(39). Espiguillas comprimidas dorsiventralmente o planoconvexas; lema del flósculo superior no diferenciada en el ápice; espiguillas no divergentes desde el eje; primera gluma no inflada en la base .42
Espiguillas rollizas; lema del flósculo superior diferenciada en el ápice; espiguillas divergentes desde el eje; primera gluma inflada en la base ..... *Lasiacis*

42(41). Lígula una membrana o una membrana ciliada; lema del flósculo superior lisa, estriada, o papilosa; pedicelos cupuliformes ..... *Panicum*
Lígula una fimbria de pelos; lema del flósculo superior rugosa; pedicelos discoides ..... *Urochloa*

43(3). Lema inferior con una cavidad central longitudinal; pedicelos con el ápice plano o convexo; lema del flósculo superior con márgenes involutos ..... *Thrasya*
Lema inferior sin una cavidad central longitudinal; pedicelos con el ápice cóncavo; lema del flósculo superior con márgenes planos 44

44(43). Lema del flósculo superior con una cicatriz o apendices basales; pedicelos con depresion plana o convexa en el ápice ..... *Echinolaena*
Lema del flósculo superior sin modificaciones basales; pedicelos con depresion cóncava en el ápice 45

45(44). Lema del flósculo inferior con un área entre el nervio central y el primer nervio lateral más delgada en textura; pedicelos oblicuos a la base de la espiguilla; eje principal con las ramificaciones primarias dísticas; segunda gluma mutica ..... *Mesosetum*
Lema del flósculo inferior consistente en textura; pedicelos perpendiculares con la base de la espiguilla; eje principal con las ramificaciones primarias ni dísticas ni secundifloras; segunda gluma aristada ... *Arthropogon*

46(2). Lema inferior con una cavidad central longitudinal; espiguillas con orientacíon adaxial; eje principal alado ..... *Thrasya*
Lema inferior sin una cavidad central longitudinal; espiguillas con orientacíon abaxial; eje principal no alado 47

47(46). Lema del flósculo inferior con un área hialina en la base; segunda gluma cartácea a endurecida; segunda gluma 13-23-nervada ..... *Setariopsis*
Lema del flósculo inferior consistente en textura; segunda gluma hialina a membranosa; segunda gluma hasta 13-nervada 48

48(47). Palea del flósculo inferior con nervios pronunciados pero no alados; cerdas escabrosas; lema del flósculo inferior no aquillad 49
Palea del flósculo inferior con nervios pronunciados hasta alados; cerdas lisas; lema del flósculo inferior aquillada ..... *Ixophorus*

49(48). Pedicelos con el ápice cóncavo; lema del flósculo superior rugosa; primera gluma encerrando la base de la espiguilla 50
Pedicelos con el ápice plano o convexo; lema del flósculo superior lisa, estriada, o papilosa; primera gluma no encerrando la base de la espiguilla ..... *Paspalum*

50(49). Eje principal con las ramificaciones primarias dísticas ..... *Paspalidium*
Eje principal con las ramificaciones primarias ni dísticas ni secundifloras ..... *Setaria*

51(1). Segunda gluma presente; estambres 3; inflorescencia linear u oblonga 52

Segunda gluma ausente; estambres 2; inflorescencia lanceolada u ovada ..... *Reimarochloa*

52(51). Segunda gluma 0.1 veces la longitud de la espiguilla o más; pedicelos con ápices glabros; inflorescencia con espiguillas cleistógamás ausentes; lema de flósculo superior opaca 53

Segunda gluma hasta 0.1 veces la longitud de la espiguilla; pedicelos con ápices pilosos; inflorescencia con espiguillas cleistógamás presentes; lema del flósculo superior brillante ..... *Paratheria*

53(52). Fascículos con 1-6 espiguillas; espiguillas no obviamente opuestas a una bráctea ensanchada 54

Fascículos con 4 espiguillas; espiguillas opuestas a una bráctea ensanchada ..... *Anthephora*

54(53). Desarticulacion en los nudos del eje principal o en la base de la inflorescencia; eje principal con la ramificacion primaria dística o secundiflora; limbos agudos a redondeados ..... *Stenotaphrum*

Desarticulacion en la base de la ramifación primaria; eje principal con las ramificaciones primarias ni dísticas ni secundifloras; limbos caudados a acuminados 55

55(54). Callo ensanchado hasta formar un receptáculo discoide ..... *Cenchrus*

Callo no ensanchado hasta formar un receptáculo discoide ..... *Pennisetum*

SYNOPTIC KEY TO THE MESOAMERICAN GENERA OF THE PANICEAE

Recognized genera

1. *Acroceras* Stapf
2. *Anthaenantia* P. Beauv.
3. *Anthephora* Schreb.
4. *Arthropogon* Nees
5. *Axonopus* P. Beauv.
6. *Brachiaria* (Trin.) Griseb.
7. *Cenchrus* L.
8. *Chaetium* Nees
9. *Digitaria* Haller
10. *Echinochloa* P. Beauv.
11. *Echinolaena* Desv.
12. *Eriochloa* Kunth
13. *Homolepis* Chase
14. *Hymenachne* P. Beauv.
15. *Ichnanthus* P. Beauv.
16. *Isachne* R. Br.
17. *Ixophorus* Schlecht.
18. *Lasiacis* (Griseb.) A. Hitchc.
19. *Melinis* P. Beauv.
20. *Mesosetum* Steud.
21. *Oplismenus* P. Beauv.
22. *Panicum* L.
23. *Paratheria* Griesb.
24. *Paspalidium* Stapf
25. *Paspalum* L.
26. *Pennisetum* Rich.
27. *Pseudechinolaena* Stapf
28. *Reimarochloa* A. Hitchc.
29. *Reynaudia* Kunth
30. *Rhynchelytrum* Nees
31. *Sacciolepis* Nash
32. *Scutachne* A. Hitchc. & Chase
33. *Setaria* P. Beauv.
34. *Setariopsis* Scribn. & Millsp.
35. *Stenotaphrum* Trin.
36. *Triscenia* Griesb.
37. *Thrasya* Kunth
38. *Urochloa* P. Beauv.

Characters

1. plantas (7)
   1. anuales: 1 3 5–7 9–12 15–16 19–27 30–31 33–35 38

2. perennes: 1 – 5 7 – 22 24 – 26 28 – 33 35 – 38
2. entrenudos (7)
   1. sólidos o esponjosos: 2 4 – 5 7 – 8 10 14 17 – 19 21 – 22 25 – 27 29 – 30 33 35
   2. huecos: 1 – 4 6 9 11 – 13 15 – 16 18 20 23 – 25 28 30 – 34 37 – 38
3. entrenudos (7)
   1. víscidos: 19
   2. glaucos: 15 25 – 26
   3. no víscidos ni glaucos: 1 – 18 20 – 38
4. ligula (8)
   1. una membrana o una membrana ciliada: 1 – 5 7 9 11 – 15 17 – 18 21 – 28 31 33 – 35 37
   2. una fimbria de pelos: 2 4 – 8 10 – 12 15 – 16 19 – 20 25 – 26 28 – 30 32 – 33 36 38
   3. ausente: 10 16
5. inflorescencia (9)
   1. panícula: 1 – 19 21 – 38
   2. racimo: 4 11 20 37
6. eje principal (7)
   1. recto: 1 – 2 4 – 38
   2. ondulado: 3 7 20 – 21 35
7. eje principal (7)
   1. con las ramificaciones primarias dísticas o secundifloras: 6 10 – 12 20 – 21 24 27 – 28 30 35 – 37
   2. con las ramificaciones primarias ni dísticas ni secundifloras: 1 – 5 7 – 19 22 – 23 25 – 26 28 – 29 31 – 34 38
8. ramificaciones primarias (7)
   1. adpresas al eje principal: 2 – 4 6 – 14 19 21 23 – 26 29 31 – 38
   2. extendidas: 1 4 – 7 9 – 13 15 – 18 21 25 – 30 32 – 33 36 38
   3. divaricadas: 9 11 18 25 28 38
   4. reflexas: 28
9. ramificaciones primarias (9)
   1. con las ramificaciones secundarias adpresas: 1 4 – 6 8 – 12 14 – 15 17 21 – 25 27 29 31 – 34 36 – 38
   2. con las ramificaciones secundarias abiertas: 2 4 9 13 15 – 16 18 – 19 22 27 – 30 32 – 33 38
   3. reducidas a un fasciculo de espiguillas: 3 7 21 26 33
10. ramificaciónes primarias (8)
   1. con espiguillas secundifloras o dísticas: 1 5 – 6 8 – 12 14 – 15 17 21 – 22 24 – 25 27 – 29 31 – 34 37 – 38
   2. con espiguillas ni secundifloras ni dísticas: 2 – 4 7 13 16 18 – 19 22 30 – 31 36
11. raquis (9)
   1. terminando en una espiguilla: 1 – 2 4 – 6 8 – 16 18 – 22 25 27 – 32 36 – 38
   2. terminando en una punta desnuda no modificada: 25 28 35 37
   3. terminando en una cerda: 3 7 17 23 – 24 26 33 – 34
12. cerdas (7)
   1. distintamente aplanadas: 3 7
   2. no distintamente aplanadas: 7 17 23 – 24 26 33 – 34
13. cerdas (8)
   1. lisas: 17

2. escabrosidad: 3 7 23 – 24 26 33 – 34
14. pedicelos (8)
1. presentes: 1 – 2 4 – 6 8 – 38
2. ausentes: 3 7 26 35
15. pedicelos (7)
1. truncados: 1 5 9 13 18 27 – 28 35 – 36
2. discoides: 4 – 6 9 – 12 14 17 19 21 24 – 25 27 29 – 34 37 – 38
3. cupuliformes: 2 9 13 15 18 22
16. pedicelos (8)
1. perpendiculares con la base de la espiguilla: 1 – 7 9 – 19 21 – 38
2. oblicuos a la base de la espiguilla: 8 13 20 29
17. pedicelos (8)
1. con el ápice cóncavo: 1 – 2 4 – 6 9 – 10 12 – 15 17 – 20 22 24 27 29 – 36 38
2. con el ápice plano o convexo: 8 11 13 – 14 21 25 29 37 – 38
18. desarticulación (9)
1. arriba de la gluma inferior o en la base de la espiguilla: 1 – 2 4 – 6 8 – 22 24 – 25 27 29 – 34 36 – 38
2. en la base de la ramificación primaria o en la base de la inflorescencia: 3 7 23 26 28 35
19. callo (7)
1. diferenciado: 3 – 4 7 – 8 10 12 20 23 26 30 37 – 38
2. no diferenciado: 1 – 2 5 – 6 9 – 11 13 – 22 24 – 38
20. callo (7)
1. prolongado en un estípite pronunciado: 3 – 4 7 – 8 10 20 23 26 37 – 38
2. no prolongado en un estípite: 4 7 12 30 37 – 38
21. callo (7)
1. ensanchado hasta formar un receptáculo discoide: 7
2. no ensanchado hasta formar un receptáculo discoide: 3 – 4 8 10 12 20 23 26 30 37 – 38
22. inflorescencia con espiguillas cleistógamás (8)
1. presentes: 23
2. ausentes: 1 – 22 24 – 38
23. espiguillas (7)
1. solitarias: 2 4 – 31 33 – 38
2. apareadas: 1 8 – 13 15 21 25 27 32 35 – 38
3. en grupos de 4: 3
24. espiguillas (7)
1. con orientación adaxial: 1 3 – 6 8 10 – 15 18 20 – 22 27 29 31 – 32 36 – 38
2. con orientación abaxial: 9 11 16 – 17 23 – 25 27 – 28 33 – 35 38
25. espiguillas (8)
1. comprimidas lateralmente: 2 4 15 19 – 21 27 29 – 30 32
2. comprimidas dorsiventralmente o planoconvexas: 1 – 3 5 – 17 20 – 26 28 31 – 38
3. rollizas: 18 24 33
26. primera gluma (8)
1. fusionada con el callo para formar un anillo hinchado: 12 37
2. no fusionada con el callo: 1 – 11 13 – 38
27. primera gluma (8)
1. presente: 1 4 6 – 27 29 – 38
2. ausente: 2 – 3 5 7 9 12 25 – 26 28 37
28. primera gluma (7)

1. hasta 0.5 veces la longitud de la espiguilla: 1 6 – 7 9 – 10 15 17 – 19 21 23 – 26 30 – 38
2. 0.51 – 0.89 veces la longitud de la espiguilla: 1 10 15 – 16 18 20 – 21 24 – 25 29 32 – 33 37 – 38
3. 0.9 veces la longitud de la espiguilla o más: 4 8 11 13 15 20 27

29. primera gluma (7)
    1. encerrando la base de la espiguilla: 1 6 10 11 14 – 15 18 22 24 27 32 – 34 36 38
    2. no encerrando la base de la espiguilla: 4 7 – 9 13 16 – 17 19 – 21 23 25 – 26 29 – 31 35 37
30. primera gluma (8)
    1. mútica a apiculada: 1 6 – 7 9 – 11 13 – 20 22 – 27 30 – 38
    2. aristada: 4 8 11 20 – 21 27 29
31. raquilla (6)
    1. prolongándose debajo de la segunda gluma: 1 8 – 10 12 – 16 19 – 20 30 32 38
    2. no prolongándose debajo de la segunda gluma: 1 – 7 9 – 11 13 15 17 – 31 33 – 38
32. raquilla (8)
    1. prolongándose entre los flósculos: 1 11 13 15 – 16 27 30 – 31
    2. no prolongándose entre los flósculos: 1 – 10 12 – 14 17 – 26 28 – 38
33. raquilla (9)
    1. con apéndices laterales: 11 15
    2. sin apéndices laterales: 1 11 13 16 27 30 – 31
34. segunda gluma (9)
    1. presente: 1 – 27 29 – 38
    2. ausente: 28
35. segunda gluma (8)
    1. hasta 0.1 veces la longitud de la espiguilla: 23
    2. 0.2 veces la longitud de la espiguilla o más: 1 – 22 24 – 27 29 – 38
36. segunda gluma (8)
    1. sacciforme: 31
    2. gibosa: 27
    3. no sacciforme ni gibosa: 1 – 26 29 – 30 32 – 38
37. segunda gluma (7)
    1. hasta 6 – nervada: 1 – 16 20 – 26 29 – 30 32 – 33 35 – 38
    2. 7, 9, o 11 – nervada: 2 5 7 – 8 10 – 13 15 – 19 21 – 22 24 – 25 27 29 31 – 33 35 37 – 38
    3. 13 – nervada o más: 18 34
38. segunda gluma (8)
    1. con indumento uncinado: 27
    2. con indumento no uncinado: 1 – 26 28 – 38
39. lema del flósculo inferior (6)
    1. hialina a membranosa: 1 – 3 5 – 15 17 19 – 26 28 – 29 31 – 34 36 – 38
    2. cartácea a endurecida: 1 4 10 16 18 – 19 26 – 27 30 32 34 – 35 38
40. lema del flósculo inferior (8)
    1. con un área hialina en la base: 27 34 37
    2. con un área entre el nervio central y el primer nervio lateral, más delgada en textura: 20 37
    3. consistente en textura: 1 – 19 21 – 26 28 – 33 35 – 36 38
41. lema del flósculo inferior (9)
    1. con una cavidad central longitudinal: 37

2. sin una cavidad central longitudinal: 1 – 36 38

42. lema del flósculo inferior (7)
    1. caudada a acuminada: 3 5 7 – 15 17 20 – 21 23 – 26 28 31 – 32 35 – 37
    2. aguda a truncada: 1 – 7 9 – 13 15 – 18 20 – 21 24 – 28 30 – 31 33 – 35 37 – 38
    3. emarginada a bífida: 4 19 29
43. lema del flósculo inferior (7)
    1. mútica a apiculada: 1 – 7 9 – 18 20 – 21 23 – 38
    2. aristada: 4 8 10 12 14 19 21 26 28 – 30
44. palea del flósculo superior (8)
    1. con nervios no pronunciados o con nervios pronunciados pero no alados: 1 – 16 18 – 38
    2. con nervios pronunciados hasta alados: 17
45. flósculo superior (8)
    1. hasta 0.49 veces la longitud del flósculo inferior: 31
    2. 0.5 – 0.8 veces la longitud del flósculo inferior: 4 – 6 9 11 – 12 15 – 17 19 – 21 24 26 – 27 30 – 31 34 36 38
    3. 0.81 veces la longitud del flósculo inferior a más: 1 – 16 18 – 26 28 – 29 31 – 35 37 – 38
46. lema del flósculo superior (7)
    1. hialina a membranosa: 4 14 19 29 – 30 36
    2. cartácea a cartilaginosa: 2 – 3 5 – 9 11 – 17 20 – 24 26 – 28 30 – 33 35 37 – 38
    3. endurecida: 1 10 12 18 24 – 25 33 – 34 38
47. lema del flósculo superior (8)
    1. lisa o escabrosa: 1 – 7 9 – 11 13 – 16 18 – 23 25 – 32 35 – 36
    2. estriada, muricada, punteada, o papilosa: 5 7 – 9 16 20 22 25 35 37
    3. rugosa: 12 17 24 32 – 34 38
48. lema del flósculo superior (6)
    1. brillante: 5 – 6 10 – 11 13 20 – 21 23 27 31
    2. opaca: 1 – 5 7 – 10 12 – 20 22 24 – 26 28 – 30 32 – 38
49. lema del flósculo superior (8)
    1. con márgenes planos: 2 – 5 7 – 9 13 – 14 19 – 20 23 26 – 27 29 – 32 35 – 36
    2. con márgenes involutos: 1 5 – 6 10 – 12 15 – 18 21 – 22 24 – 26 28 33 – 35 37 – 38
50. lema del flósculo superior (7)
    1. con márgenes más delgados en textura que el cuerpo: 2 – 5 7 9 13 23 26
    2. con márgenes no más delgados en textura que el cuerpo: 1 4 – 8 10 – 12 14 – 22 24 – 38
51. lema del flósculo superior (8)
    1. con una cicatriz o ápendices basales: 11 15
    2. estrecha en la base: 1 7 18 24 – 25 33
    3. sin modificaciones basales: 1 – 10 12 – 14 16 – 38
52. lema del flósculo superior (8)
    1. diferenciada en el ápice: 1 – 2 10 18 37 – 38
    2. no diferenciada en el ápice: 2 – 9 11 – 17 19 – 38
53. lema del flósculo superior (7)
    1. con el ápice hialino y ensanchado: 2
    2. con el ápice membranoso: 10
    3. el ápice con un penacho de pelos: 18
    4. con un ápice crestado: 18

5. con un ápice conduplicado: 1 38
54. estambres (7)
1. 2: 28 – 29
2. 3: 1 – 27 30 – 38
55. sea C – 3 o C – 4 (9)
1. C – 4: 2 – 10 12 17 19 – 20 22 – 30 32 – 35 37 – 38
2. C – 3: 1 11 13 – 16 18 21 – 22 31 36
56. sea XyMs + o XyMs – (8)
1. XyMs +: 1 6 11 – 16 18 – 19 21 – 22 30 – 32 36 38
2. XyMs –: 2 – 5 7 – 10 17 20 22 – 29 33 – 35 37
57. numero básico de cromosomás (7)
1. hasta 9: 1 3 6 – 7 9 – 12 18 – 22 24 26 28 30 – 31 33 35 38
2. 10 a más: 5 7 13 – 16 21 – 22 25 33 37 – 38

ACROCERAS Stapf, Fl. Trop. Afr. 9:621. 1920. TYPE SPECIES: *A. zizanioides* (Kunth) Dandy.

Commelinidium Stapf, Fl. Trop. Afr. 9:627. 1920. TYPE SPECIES: *C. gabonense* Stapf.
Neohusnotia A. Camus, Bull. Mus. Hist. Nat. 26:664. 1921. TYPE SPECIES: *N. tonkinensis* (Bal.) A. Camus.

Plants annual or perennial. Internodes hollow (somewhat lignified); neither viscid nor glaucous. Ligule a membrane or a ciliate membrane. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches spreading; with appressed secondary branches (slightly spreading); with secund spikelets. Rachis terminating in a spikelet. Pedicels present; truncate (approaching discoid); perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets paired; adaxial; dorsiventrally compressed (approaching lateral compression). First glume not fused with the callus; present; 0.5 – 0.8 times spikelet length; encircling the spikelet base; muticous. Rachilla pronounced or not pronounced below the second glume; pronounced or not pronounced between the florets; lacking lateral appendages. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 5 – nerved; indumentum not uncinate. Lemma of lower floret membranous to chartaceous; consistent in texture; lacking a central longitudinal groove; acute; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.9 – 1 times the length of the lower floret. Lemma of upper floret indurate; *smooth*; dull; with involute margins; with margins of the same texture as the body; constricted at the base or without basal modifications; differentiated at the apex; *conduplicate at the apex*. Stamens 3. C – 3. XyMs +. Base chromosome number, x = 9.

Remarks: *Acroceras* consists of about 20 species. Most are endemic to Madagascar, and others occur in the tropics of Asia, Africa, and the Americas. The genus is characterized by the conduplicate differentiated apex of the upper lemma. This morphologically differs from the crested apex of the upper floret in the Asian genus *Cyrtococcum* Stapf. Additional important characteristics of *Acroceras* include the relatively long first glume, smooth upper floret, C − 3 photosynthetic pathway, and presence of a rachilla internode in some taxa. The closest relative may be *Ichnanthus*. One species, *A. zizanioides* (Kunth) Dandy, is widespread in the tropics of Asia, Africa, and the Americas. Clayton and Renvoize (1982) describe African specimens of this species as lacking a rachilla between the glumes; however, American specimens possess a distinct rachilla between the glumes and at the base of the upper floret. The New World specimens may be incorrectly placed in this species; however, a detailed systematic study of *A. zizanioides* is required to be certain.

Acroceras paucispicatum (Morong) Henr., a South America species, has the conduplicate apex of the upper floret which is diagnostic for *Acroceras*; however, it is C − 4 subtype PcK and the upper floret is rugose. Therefore, this species is improperly assigned to *Acroceras*, but fits within the generic concept of *Urochloa* as outlined and discussed by Webster (1987 & 1988).

ARTHROPOGON Nees, Agrost. Bras. 319. 1829. TYPE SPECIES: *A. villosus* Nees.

Achlaena Griseb., Cat. Pl. Cub. 228. 1866. TYPE SPECIES: *A. piptostachya* Griseb.

Plants perennial. Internodes spongy or hollow; neither viscid nor glaucous. Ligule a ciliate membrane or a fringe of hairs. Inflorescence a panicle or a raceme. Main axis straight; with quaquaversal primary branches. Primary branches appressed to the main axis or spreading; with appressed or spreading secondary branches; with spikelets neither secund nor distichous. Rachis terminating in a spikelet. Pedicels present; discoid; perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. *Callus differentiated*; prolonged or not prolonged into a stipe; not flared to form a discoid receptacle. Cleistogamous inflorescence absent. Spikelets solitary; adaxial; laterally compressed. First glume not fused with the callus; present; 1 − 6 times spikelet length; not encircling the spikelet base; *awned*. Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 3 or 5-nerved; indumentum not uncinate. Lemma of lower floret chartaceous to cartilaginous; consistent in texture; lacking a central longitudinal groove; acute or bifid; muticous or awned. Palea of lower floret with nerves pronounced but not winged.

Upper floret 0.7 – 1 times the length of the lower floret. Lemma of upper floret *hyaline to membranous*; smooth; dull; with flat margins; with margins thinner in texture or of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C – 4. XyMs-.

Remarks: Filgueiras' (1982) revision of *Arthropogon* recognized six species. One species, *A. piptostachyus* (Griseb.) Pilger, occurs in Cuba and Jamaica, the remaining species being native to Brazil. This genus and *Reynaudia* are the only members of the subtribe Arthropogonineae Butzin. Diagnostic characteristics of *Arthropogon* include lateral compression of the spikelets, a differentiated callus, awned glumes, dense-textured glumes, a thin-textured upper floret, and an emarginate or bifid second glume and lower lemma. Additional interesting features include the racemose inflorescence of *A. xerachne* Ekman, whorled primary branches, hairy axils, and a first glume that is reduced to a setaceous awn.

Recent treatments (Filgueiras 1982; Clayton & Renvoize 1986) of *Arthropogon* place *Achlaena* Griseb. in synonomy. *Achlaena* was described in 1866 with one species, *A. piptostachya* Griseb. Hitchcock (1936) recognized *Achlaena* but indicated that it was closely related to *Arthropogon*. Anatomical evidence linking these genera was provided by Tateoka (1963). Significant characteristics of *Arthropogon piptostachyus* which differentiate it from other taxa of *Arthropogon* include presence of a prolonged stipitate callus lacking long setaceous hairs, pedicel apex not distinctly discoid, secondary inflorescence branches appressed, spikelets not obviously laterally compressed, second glume not emarginate nor bifid, and finally, its isolated distribution in Cuba and Jamaica. These characteristics support the recognition of *Achlaena* as a monotypic genus; however, until more detailed studies are made we have decided to follow the concepts proposed by Filgueiras (1982).

CHAETIUM Nees, Agrost. Bras. 269. 1829. TYPE SPECIES: *C. festucoides* Nees.

Berchtoldia Presl, Rel. Haenk. 1:323. 1830. TYPE SPECIES: *B. bromoides* Presl.

Plants perennial. Internodes spongy; neither viscid nor glaucous. Ligule a fringe of hairs. *Inflorescence a panicle*. Main axis straight; with quaquaversal primary branches. Primary branches appressed to the main axis; with appressed secondary branches; with secund spikelets (but not obvious). Rachis terminating in a spikelet. Pedicels present; *oblique to the spikelet base*; flat. Disarticulation at the spikelet base. *Callus differentiated* (oblique at the base and ca 0.5 mm long); prolonged into a pronounced stipe; not flared to form a discoid receptacle. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial; dorsiventrally compressed.

First glume not fused with the callus; present; 1 − 1.1 times spikelet length; not encircling the spikelet base; awned. Rachilla pronounced below the second glume; not pronounced between the florets. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 3, 5, or 7-nerved; indumentum not uncinate. Lemma of lower floret hyaline to membranous; consistent in texture; lacking a central longitudinal groove; acuminate; awned. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.9 − 1 times the length of the lower floret. Lemma of upper floret cartilaginous; striate to muricate; dull; with flat margins; with margins of the same texture as the body (with a thin hyaline margin); without basal modifications; not differentiated at the apex. Stamens 3. C − 4. XyMs-.

Remarks: *Chaetium* is a New World genus of three species, which occur in the West Indies, Mexico, and Central and South America. Some agrostologists have suggested that the closest relative of *Chaetium* is *Echinochloa*; however, we find little or no evidence to support that concept. The relationship of *Chaetium* in the Paniceae is presently unclear. Taxonomically significant characteristics of *Chaetium* include the flat and oblique pedicel apex, presence of a prolonged callus, and development of the floral bracts. The base of the spikelet at the point of disarticulation is prolonged, hairy, and oblique.

In *C. bromoides* (Presl) Hemsl. the first glume is relatively large, awned, and coarse in texture, whereas the lower lemma is relatively thin in texture. In *C. festucoides* Nees the first glume is reduced to an awn and the lower lemma is somewhat coarser in texture.

ECHINOLAENA Desv., J. Bot. Agr. 1:75. 1813. TYPE SPECIES: *E. hirta* Desv.

Chasechloa A. Camus, Bull. Soc. Bot. France 95:330. 1949. TYPE SPECIES: *C. madagascariensis* (Baker) A. Camus.

Plants annual or perennial. Internodes hollow; neither viscid nor glaucous. Ligule a ciliate membrane or a fringe of hairs. Inflorescence a raceme or panicle. Main axis straight; with secund or quaquaversal primary branches. Primary branches appressed to the main axis to divaricate; with appressed secondary branches; with secund spikelets. Rachis terminating in a spikelet. Pedicels present; discoid (not obvious); perpendicular with the spikelet base; *flat to convex*. Disarticulation at the spikelet base (with a secondary point at the base of the primary branch). Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial or abaxial; dorsiventrally compressed. First glume not fused with the callus; present; 0.9 − 1.7 times spikelet length; encircling the spikelet

base; muticous or awned. Rachilla not pronounced below the second glume; pronounced between the florets; with lateral appendages or lacking lateral appendages. Second glume present; 0.5 − 0.9 times spikelet length; neither saccate nor gibbose; 5- or 7-nerved; indumentum not uncinate. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate to acute; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.7 − 1 times the length of the lower floret. Lemma of upper floret cartilaginous; smooth; shiny; with involute margins; with margins of the same texture as the body; *with basal scars or appendages*; not differentiated at the apex. Stamens 3. C − 3. XyMs + . Base chromosome number, x = 9.

Remarks: *Echinolaena* consists of about eight species which occur from Madagascar and Africa to the tropics of New World. One species, *E. gracilis* Swallen, extends into the Mesoamerican region. *Echinolaena* is closely related to *Ichnanthus*. *Echinolaena minarum* (Nees) Pilger is intermediate bewteen these genera.

HOMOLEPIS Chase, Proc. Biol. Soc. Wash. 24:146. 1911. TYPE SPECIES: *H. aturensis* (Kunth) Chase.

Plants perennial. Internodes hollow; neither viscid nor glaucous. Ligule a membrane. Inflorescence a panicle. Main axis straight; with quaversal primary branches. Primary branches appressed to the main axis or spreading; with spreading secondary branches; with spikelets neither secund nor distichous (or not obviously secund). Rachis terminating in a spikelet. Pedicels present; truncate to cupuliform; perpendicular or oblique to the spikelet base; concave to flat. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial; dorsiventrally compressed. First glume not fused with the callus; present; *0.9 − 1.1 times spikelet length*; not encircling the spikelet base; *muticous* (slightly apiculate in *H. glutinosa*). Rachilla pronounced or not pronounced below the second glume; pronounced or not pronounced between the florets; *lacking lateral appendages*. Second glume present; 0.9 − 1 times spikelet length; neither saccate nor gibbose; 5, 7, or 9-nerved; *indumentum not uncinate*. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate to acute; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 1 − 1.1 times the length of the lower floret. Lemma of upper floret chartaceous to coriaceus; smooth; shiny or dull; with flat margins; with margins thinner in texture than the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 3. XyMs + . Base chromosome number, x = 10.

Remarks: The presence of subequal glumes was the primary character used by Chase (1911) to distinguish *Homolepis* from related genera. In addition, for all taxa except *H. glutinosa* (Sw.) Zul. & Sod. the glumes are longer than other spikelet parts. Zuloaga and Soderstrom (1985) revised the genus and recognized five species occurring from Mexico to Brazil. Two new species were named in that study; however, the authors do not provide an anatomical evaluation of the taxa, which is critical in *Homolepis*. Watson et al. (1986) reports that all species, except *H. longispicula* (Doell) Chase, have well-developed fusoid cells in the leaves, a characteristic of bambusoid grasses. Additional significant features of *Homolepis* include the relatively thin upper lemma with flat hyaline margins, presence of a pronounced rachilla between the glumes, and paired spikelets both with relatively long pedicels at the lower inflorescence axils. This last character appears to be a primative condition. The pedicel apex is perpendicular to the spikelet in all taxa except *H. glutinosa*, in which it is oblique. The nervation pattern and pubescence of the second glume and lower lemma in *H. longispicula* is very similar to that found in many species of *Digitaria*.

ICHNANTHUS P. Beauv., Ess. Agrost. 56. 1812.—*Panicum* L. sect. *Ichnanthus* (P. Beauv.) Trin., Mém. Acad. Imp. Sci. St.-Ptersbourg, Sr. 6, Sci. Math. 1:195. 1834. TYPE SPECIES: *I. panicoides* P. Beauv.

Navicularia Raddi, Agrost. Bras. 38. 1823. TYPE SPECIES: *N. lanata* Raddi.

Plants annual or perennial. Internodes hollow; glaucous, or neither viscid nor glaucous. Ligule a membrane, a ciliate membrane, or a fringe of hairs. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches spreading; with appressed or spreading secondary branches; with secund spikelets. Rachis terminating in a spikelet. Pedicels present; cupuliform (approaching truncate in some taxa); perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial; laterally or dorsiventrally compressed. First glume not fused with the callus; present; 0.5 – 1 times spikelet length; encircling the spikelet base; muticous or apiculate. Rachilla pronounced or not pronounced below the second glume; pronounced between the florets; with lateral appendages. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 3, 5, or 7-nerved; indumentum not uncinate. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate to acute; muticous. Palea of lower floret with nerves not pronounced. Upper floret 0.7 – 1 times the length of the lower floret. Lemma of upper floret

cartilaginous; smooth; dull; with involute margins; with margins of the same texture as the body; *with basal scars or appendages; not differentiated at the apex. Stamens 3. C − 3. XyMs +* . Base chromosome number, x = 10.

Remarks: Ichnanthus consists of thirty species. All occur in the tropics of the New World except *I. pallens* var. *major* (Nees) Stieber, which is widespread in Africa, Asia, and Australia. Comprehensive revisions of the two recognized sections of *Ichnanthus* were published by Stieber (1982 & 1987). The most diagnostic feature of the genus is the presence at the base of the upper floret of a prolonged rachilla with obvious appendages or sclerified tissue. Shaw and Webster (1983) provided a comparative study of the upper floret for the species of *Ichnanthus*. Lazarides and Webster (1984) proposed a new genus, *Yakirra* Lazarides & R. Webster, for the Australian C − 4 species previously placed in *Ichnanthus*.

Previous authors (including Webster) have referred to the stipitate prolongation at the base of the upper floret as a rachilla, which is by definition, the axis of the spikelet. The term, rachilla, has probably, if not certainly, been misapplied in *Ichnanthus*. The prolongation may represent what Webster (1988) refers to as a callus, that is any modification on the disseminule at the point of disarticulation. This consideration is supported by two observations. First, in the Paniceae when there is a secondary point of disarticulation above the spikelet base, it is never at the base of a rachilla internode but always at the apex of a rachilla internode. It is not uncommon in the Paniceae to find a secondary point of disarticulation at the base of the upper floret. Second, the membranous appendages characteristic of this genus are continuously attached to the prolongation and upper lemma, suggesting that they are a part of the same structure. This concept is important to the systematics of the Paniceae because the prolongation in *Homolepis, Yakirra, Ichnanthus*, and *Phanopyrum* may not be analagous to the prolongation in *Isachne* or *Arthragrostis* Lazarides.

ISACHNE R. Br., Prodr. Fl. Nov. Holl. 196. 1810. TYPE SPECIES: *I. australis* R. Br.

Plants annual or perennial. Internodes hollow; neither viscid nor glaucous. Ligule a fringe of hairs or absent. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches spreading; *with spreading secondary branches*; with spikelets neither secund nor distichous (or not obviously secund or distichuous). Rachis terminating in a spikelet. Pedicels present; perpendicular with the spikelet base. Disarticulation above the lower glume. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary; abaxial; dorsiventrally

compressed. First glume not fused with the callus; present; 0.8 times spikelet length; not encircling the spikelet base; muticous. Rachilla pronounced below the second glume; *pronounced between the florets; lacking lateral appendages*. Second glume present; 0.7 − 0.95 times spikelet length; neither saccate nor gibbose; 5, 7, or 9-nerved; indumentum not uncinate. Lemma of lower floret cartilaginous (membranous to chartaceous in *I. polygonoides*); consistent in texture; lacking a central longitudinal groove; rounded; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.7 − 1 times the length of the lower floret. Lemma of upper floret cartilaginous; smooth or striate; dull; *with involute margins*; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 3. XyMs + . Base chromosome number, x = 10.

Remarks: *Isachne* is commonly placed in the Isachinae Benth., a tribe of five genera characterized by the number of fertile florets (2), method of disarticulation, and certain unique anatomical characters; however, it is occasionally included in the Paniceae subtribe Isachninae Stapf. About 100 species are currently recognized in *Isachne*; most occur in the Old World tropics, a few occur in South America, and seven species (Hitchcock 1920) in Mesoamerica.

Diagnostic features of *Isachne* include the non-indurate texture of the upper floret, spreading secondary inflorescence branches, presence of two morphologically similar florets (except in *I. polygonoides* (Lam.) Doell), and disarticulation above the glumes. Presence of two homomorphic fertile florets is characteristic of *Dissochondrus* (Hillebr.) Kuntze, a monotypic genus endemic to Hawaii. However, this genus has bristles subtending the spikelets and a rugose upper floret, and is obviously closely related to *Setaria*. Perhaps the most significant characteristic of *Isachne* is the method of disarticulation and morphology of the pedicel apex. The glumes are separated by a well-developed rachilla and the primary point of disarticulation is at the base of the florets. The glumes fall off later, but the associated internode is persistent on the pedicel apex. In other members of the Paniceae with a rachilla pronounced between the glumes, the rachilla is not persistent on the pedicel. Therefore, in *Isachne* the pedicel apex is not truncate, discoid, cupuliform, or otherwise differentiated as in other members of the Paniceae.

Additional significant characteristics of *Isachne* expressed in some or all of the species include the presence of a pronounced filiform rachilla between the florets, a hairy upper floret, and distichous leaves. As previously stated, the florets are morphologically similar; however, the upper

floret is usually slightly smaller. A final interesting feature of *Isachne* is the relatively small spikelet size, with the average length being ca. 1.9 mm with a maximum of ca. 2.5 mm. This is relatively small for such a numerically large tropical genus.

IXOPHORUS Schlecht., Linnaea 31:420. 1861. TYPE SPECIES: *I. unisetus* (Presl) Schlecht.

Plants perennial. Internodes solid; neither viscid nor glaucous. Ligule a membrane. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches spreading; with appressed secondary branches; with secund spikelets. Rachis terminating in a bristle. Bristles not distinctly flattened; smooth (and viscid). Pedicels present; discoid; perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary; abaxial; dorsiventrally compressed. First glume not fused with the callus; present; 0.22−0.32 times spikelet length; not encircling the spikelet base; muticous. Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 9 or 11-nerved; indumentum not uncinate. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate to acute; muticous. *Palea of lower floret with nerves pronounced into obvious wings*. Upper floret 0.7−0.76 times the length of the lower floret. Lemma of upper floret cartilaginous; faintly rugose; dull; with involute margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C−4. XyMs-.

Remarks: *Ixophorus* is monotypic and occurs in Mexico, Central America, and the Caribbean. Presence of bristles, disarticulation at the base of the spikelet, and a rugose upper floret indicate that *Ixophorus* is closely allied to *Setaria*. The primary inflorescence branches of *Ixophorus* are simple with solitary spikelets subtended by a single purple bristle. The bristle of this genus is unique within the Paniceae in being smooth and viscid, whereas other bristle-bearing genera have scabrous or hairy bristles that are not viscid. The bristle of *Ixophorus* is morphologically similar to the awn of the first glume in *Oplismenus*. At maturity the lower palea is distinctly winged on the nerves. Another unique and interesting characteristic of this genus is the presence of a small flange of tissue at the base of the second glume.

MESOSETUM Steud., Syn. Pl. Glum. 1:118. 1854. TYPE SPECIES: *M. cayennense* Steud.

Panicum sect. *Bifaria* Hack., Oest. Bot. Zeitschr. 47:75. 1897.—*Bifaria* (Hack.) Kuntze, Rev. Gen. Pl. 3:359. 1898. TYPE SPECIES: *P. bifarium* Hack.
Peniculus Swallen, Amer. J. Bot. 19:581. 1932. TYPE SPECIES: *P. angustifolius* Swallen.

Plants annual or perennial. Internodes hollow; neither viscid nor glaucous. Ligule a fringe of hairs. *Inflorescence a raceme*. Main axis straight or wavy; with secund primary branches. Rachis terminating in a spikelet. Pedicels present; oblique to the spikelet base; concave. Disarticulation at the spikelet base. Callus differentiated or not differentiated; prolonged into a pronounced stipe; not flared to form a discoid receptacle. Cleistogamous inflorescence absent. Spikelets solitary; adaxial; laterally compressed to dorsiventrally compressed. First glume not fused with the callus; present; 0.6 − 1.3 times spikelet length; not encircling the spikelet base; muticous or awned. Rachilla pronounced or not pronounced below the second glume; not pronounced between the florets. Second glume present; 0.7 − 1 times spikelet length; neither saccate nor gibbose; 3 or 5-nerved; indumentum not uncinate. Lemma of lower floret membranous; *with the area between the central nerve and the first lateral nerve thinner in texture than the rest of the structure; lacking a central longitudinal groove;* acuminate to rounded; muticous or apiculate. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.8 − 1 times the length of the lower floret. Lemma of upper floret chartaceous to cartilaginous; smooth or striate; shiny or dull; with flat margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 4. XyMs-. Base chromosome number, x = 8.

Remarks: *Mesosetum* was revised by Swallen (1937) who recognized 33 species and grouped these into 6 sections. Most species are native to South America but a few extend into Central America, Mexico, and the Caribbean. The most striking feature of this genus is the strictly racemose inflorescence with very short appressed pedicels. The lowermost inflorescence node is not differentiated as it is in *Thrasya,* which has the same inflorescence form. Additional significant characteristics of *Mesosetum* include oblique pedicel apices, a relatively long second glume, the hyaline central area of the lower lemma, and presence of a pronounced callus in some taxa (e.g., *M. compressum* Swallen). In many taxa, the first glume is differentiated from the second glume in color, shape, vestiture, and texture.

PARATHERIA Griseb., Cat. Pl. Cub. 236. 1866. TYPE SPECIES: *P. prostrata* Griseb.

Plants annual (but persisting for more than one year). Internodes hollow; neither viscid nor glaucous. Ligule a ciliate membrane (the membranous

part only about 0.2 mm long). Inflorescence a panicle. Main axis straight; with quaquaversal primary branches (possibly distichous but difficult to determine). Primary branches appressed to the main axis; with appressed secondary branches. Rachis terminating in a bristle. Bristles not distinctly flattened; antrorsely scabrous. Pedicels present; perpendicular with the spikelet base. Disarticulation at the base of the primary branches. Callus differentiated; prolonged into a pronounced stipe (ca 3 mm long); not flared to form a discoid receptacle. Cleistogamous inflorescence present. Spikelets solitary; with lateral orientation or abaxial; dorsiventrally compressed. First glume not fused with the callus; present; 0.05 − 0.07 times spikelet length; not encircling the spikelet base; muticous. Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; *0.05 − 0.07 times spikelet length*; neither saccate nor gibbose; nerveless; indumentum not uncinate. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate; mucronate. Palea of lower floret with nerves pronounced but not winged. Upper floret 1 times the length of the lower floret. Lemma of upper floret chartaceous; smooth; shiny; with flat margins; with margins thinner in texture than the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 4. XyMs-.

Remarks: *Paratheria* consists of two species which inhabit wet tropical areas. *Paratheria prostrata* occurs in West Africa and Central and South America, whereas *P. glaberrima* C. E. Hubb. is restricted to Sierra Leone. Primary branches of the inflorescence in *Paratheria* are reduced to a single spikelet subtended by a pronounced bristle. Disarticulation is at the base of the primary branch, which has a pronounced callus. The callus is prolonged and oblique to the main axis. These unusual characteristics are identical to those found in the monotypic Australian genus, *Chamaeraphis* R. Br. The second glume is reduced to a small, hyaline, and nerveless scale less than 0.1 times spikelet length. An inflorescence consisting of a solitary cleistogamous spikelet is occasionally present in the lower leaf sheaths. The cleistogamous spikelets are morphologically similar to the chasmogamous spikelets. Additional interesting features include flat hyaline margins on the upper lemma and presence of a ring of hairs on the pedicel apex and spikelet base.

PSEUDECHINOLAENA Stapf, Fl. Trop. Afr. 9:494. 1919. TYPE SPECIES: *P. polystachya* (Kunth) Stapf.

Perulifera A. Camus, Bull. Soc. Bot. France 74:889. 1928. Type species: *P. madagascariensis* A. Camus.

Plants annual. Internodes solid; neither viscid nor glaucous. Ligule a

membrane. Inflorescence a panicle. Main axis straight; with distichous primary branches. Primary branches spreading; with appressed or spreading secondary branches; with distichous spikelets. Rachis terminating in a spikelet. Pedicels present; truncate or discoid (not easily determined); perpendicular with the spikelet base; concave. Disarticulation above the lower glume or at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary or paired (the lower spikelet commonly reduced); adaxial or abaxial (depending on the development of the lower spikelet); laterally compressed. First glume not fused with the callus; present; 0.9 − 1.1 times spikelet length; encircling the spikelet base; muticous, mucronate, or awned. Rachilla not pronounced below the second glume (or minute); pronounced between the florets (minute and positioned on the adaxial side of the spikelet); lacking lateral appendages. Second glume present; 0.95 − 1 times spikelet length; gibbose; 7-nerved; *indumentum uncinate*. Lemma of lower floret chartaceous; with a hyaline area at the base; lacking a central longitudinal groove; acute; muticous. Palea of lower floret with nerves not pronounced. Upper floret 0.65 − 0.75 times the length of the lower floret. Lemma of upper floret cartilaginous; smooth; shiny; with flat margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 4. XyMs-.

Remarks: Bosser (1975) revised *Pseudechinolaena* and recognized six species, 5 restricted to Madagascar and one, *P. polystachya* (Kunth) Stapf, occurring in tropical America, Africa, and Asia. The vegetative features of this genus are similar to those of *Oplismenus*, with trailing culms and lanceolate to ovate leaves. The spikelets are usually paired but the lower spikelet is commonly reduced. The first glume is relatively long and smooth to scabrous or rarely with strigose hairs. The second glume is distinctly gibbose with well-developed setaceous uncinate hairs which are best expressed at maturity. Uncinate spikelet hairs also occur in *Ancistrachne* S.T. Blake, a genus of 4 species native to Asia and Australia. These genera, *Ancistrachne* and *Pseudechinolaena*, also have obliquely attached spikelets, but are otherwise morphologically dissimilar and unrelated.

The most distinctive structure of *Pseudechinolaena* is the lower lemma. Important characteristics are a relatively dense texture, papillate surface ornamentation, presence of a distinct hyaline area at the base, light-colored margins, and an apex differentiated in texture and color. The upper floret is similar to that found in *Oplismenus* in being relatively small and shiny, with a minute flat rachilla; however, the upper floret is slightly, obliquely attached with flat overlapping margins as in *Digitaria*. Interesting features of Madagascar species include the presence of an awned first glume in *P.*

madagascariensis (A. Camus) Bosser and a winged second glume in *P. camusiana* Bosser. The closest relative of *Pseudechinolaena* is probably either *Alloteropsis* or *Oplismenus*.

REYNAUDIA Kunth, Rév. Gram. 1:195. 1830. TYPE SPECIES: *R. filiformis* (Schult.) Kunth.

Plants perennial. Internodes solid; neither viscid nor glaucous. Ligule a fringe of hairs. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches appressed to the main axis or spreading; with appressed or with spreading secondary branches; with secund spikelets (but not obvious). Rachis terminating in a spikelet. Pedicels present; discoid; perpendicular or oblique to the spikelet base (on the terminal spikelets); concave to flat. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary; adaxial; laterally compressed. First glume not fused with the callus; present; 0.68−0.8 times spikelet length; not encircling the spikelet base; *awned* (from between the lobes). Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; 1 times spikelet length; neither saccate nor gibbose; 5 or 7-nerved; indumentum not uncinate. Lemma of lower floret hyaline to membranous; consistent in texture; lacking a central longitudinal groove; emarginate to bifid (the lobes ca 0.3 mm long, acute); mucronate to awned. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.9 times the length of the lower floret. Lemma of upper floret hyaline; smooth; dull; with flat margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. *Stamens* 2. C−4. XyMs-.

Remarks: *Reynaudia* is monotypic, occurs in the West Indies, and probably closely related to *Melinis* and *Rhynchelytrum*. Few collections are available, and it is assumed to be relatively rare. Significant characteristics include lateral compression of the spikelets, awned and bifid glumes and lower lemma, upper lemma thinner in texture than the glumes, and absence of a well-developed upper palea. In addition, the terminal spikelet of a group is obliquely attached to the pedicel. A very interesting feature of this genus is the presence of a purple ring of tissue (most obvious at maturity) on the adaxial surface of the pedicel and surrounding the rachis immediately below the attachment of the pedicel. It seems possible that these areas are responsible for secreting a chemical which either attracts or repels insects, thereby protecting the spikelets or assisting in dispersal.

SCUTACHNE A. Hitchc. & Chase, Proc. Biol. Soc. Wash. 24:148. 1911. TYPE SPECIES: *S. dura* (Griseb.) A. Hitchc. & Chase.

Plants perennial. Internodes hollow; neither viscid nor glaucous. *Ligule a fringe of hairs*. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches appressed to the main axis or spreading; with appressed or spreading secondary branches; *with secund spikelets*. *Rachis terminating in a spikelet*. Pedicels present; discoid; perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets paired; adaxial; laterally to dorsiventrally compressed. First glume not fused with the callus; present; 0.5 − 0.7 times spikelet length; encircling the spikelet base; *muticous*. Rachilla pronounced below the second glume; not pronounced between the florets. Second glume present; 0.8 − 0.9 times spikelet length; neither saccate nor gibbose; 5 or 7-nerved; indumentum not uncinate. Lemma of lower floret membranous to chartaceous; consistent in texture; lacking a central longitudinal groove; acuminate (conduplicate); muticous. Palea of lower floret with nerves pronounced but not winged (slightly thickened). Upper floret 0.95 − 1 times the length of the lower floret. Lemma of upper floret cartilaginous; smooth or rugose; dull; *with flat margins* (somewhat involute in *S. dura*); with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C-4. XyMs+.

Remarks: Chase (1911) distinguished *Scutachne* from related genera based on the relatively coarse-textured second glume and lower lemma, subindurate upper floret, flat margins of the upper lemma, and the apex of the upper palea not enclosed by the upper lemma. The two recognized species, *S. dura* (Griesb.) A. Hitchc. & Chase and *S. amphistemon* (Wright) A. Hitchc. & Chase, were placed in *Alloteropsis* by Hitchcock (1909). *Scutachne* appears to be closely related to *Urochloa* (sensu Webster 1987 & 1988). Clayton and Renvoize (1986) used the non-racemose primary inflorescence branches to distinguish *Scutachne* from *Brachiaria* and *Urochloa*; however, this character has limited value when the variation in *Pseudobrachiaria* Launert, a synonym of *Urochloa*, is considered.

There are a number of important characteristics which serve to distinguish *Scutachne* from related genera; however, some of these are not well-expressed in some specimens. The lower part of the first glume is noticeably fused and the rachilla between the glumes is frequently pronounced, but these features are also found in some species of *Urochloa*. The second glume and lower lemma are relatively coarse textured, but it would be difficult to use this as a primary character for distinguishing the genera. The most important aspect of the second glume and lower lemma is the acuminate and conduplicate apices. In addition, these structures are slightly, laterally

compressed. The upper lemma of *S. dura* is rugose, as expected for a C − 4 PcK genus; however, in *S. amphisetemon* it is smooth. The upper floret is relatively thin in texture with flat margins, but the latter feature is not clearly expressed in some specimens of *S. dura*. Finally, the palea apex of the upper floret is not enclosed by the upper lemma.

The range of variation at species level is not well-understood. One form of *S. dura* has linear leaf blades, spreading primary inflorescence branches, and spreading secondary branches. In another form, the leaf blades are narrow to filiform, the primary branches are reduced and appressed to the main axis, and the secondary branches are also appressed. Additional studies may show that this form is worthy of formal recognition at species level. *Scutachne amphistemon* is obviously distinct from *S. dura*; however, more collections are needed to determine the full range of variation for these species.

SETARIOPSIS Scribn. & Millsp., Publ. Field Mus. Bot. Ser. 1:288. 1896.
TYPE SPECIES: *S. latiglumis* (Vasey) Scribn. & Millsp.

Plants annual. Internodes hollow; neither viscid nor glaucous. Ligule a ciliate membrane. Inflorescence a panicle. Main axis straight; with quaquaversal primary branches. Primary branches appressed to the main axis; with appressed secondary branches; with secund spikelets. *Rachis terminating in a bristle*. Bristles not distinctly flattened; antrorsely scabrous. Pedicels present; discoid; perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated (but with a minute fused part at the base of the first glume). Cleistogamous inflorescence absent. Spikelets solitary; abaxial; dorsiventrally compressed. First glume not fused with the callus; present; 0.3 − 0.4 times spikelet length; encircling the spikelet base; muticous. Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; 0.85 − 1 times spikelet length; neither saccate nor gibbose; *13 − 23-nerved*; indumentum not uncinate. Lemma of lower floret membranous to chartaceous, or cartilaginous (at the basal margins); with a hyaline area at the base (developing at maturity); lacking a central longitudinal groove; acute; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.65 − 0.85 times the length of the lower floret. Lemma of upper floret indurate; rugose; dull; with involute margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C − 4. XyMs-.

Remarks: *Setariopsis* consists of two species which occur in Mexico and may extend south to Colombia. The two species, *S. latiglumis* (Vasey)

Scribn. & Millsp. and *S. auriculata* (Fourn.) Scribn. & Millsp., are easily distinguished on vegetative and spikelet characteristics. The presence of bristles, disarticulation at the base of the spikelet, rugose upper floret, and quaquaversal primary inflorescence branches ally *Setariopsis* with *Setaria*. *Setariopsis* has unique modifications of the glumes and lower lemma which serve to distinguish it from *Setaria*. The first glume is many nerved with the apex transversely involute, and the whole structure is reflexed at maturity. The second glume is relatively dense in texture, many nerved, and the outer portion becomes expanded and flared at maturity. In addition, the margins are swollen and apparently glandular. The lower lemma has a hyaline area at the base similar to that found in *Alloteropsis*. In addition, the lower lemma has a central groove, swollen dense-textured areas at the base, and is fused to the vestigial lower palea. All the previous characteristics are pronounced in *S. latiglumis*, whereas *S. auriculata* is intermediate with *Setaria*.

TRISCENIA Griseb., Mem. Amer. Acad. Art. ser. 2(8):534. 1863. TYPE SPECIES: *T. ovina* Griseb.

Plants perennial. Internodes neither viscid nor glaucous. Ligule a fringe of hairs. Inflorescence a panicle. Main axis straight; with distichous primary branches. Primary branches appressed to the main axis or spreading; *with appressed secondary branches*; with spikelets neither secund nor distichous. Rachis terminating in a spikelet. Pedicels present; truncate; perpendicular with the spikelet base; concave. Disarticulation at the spikelet base. Callus not differentiated. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial; dorsiventrally compressed. First glume not fused with the callus; present; 0.4−0.5 times spikelet length; encircling the spikelet base; *muticous*. Rachilla not pronounced below the second glume; not pronounced between the florets. Second glume present; 1.1 times spikelet length; neither saccate nor gibbose; 3 or 5-nerved; indumentum not uncinate. Lemma of lower floret membranous; consistent in texture; lacking a central longitudinal groove; acuminate; muticous. Palea of lower floret with nerves pronounced but not winged. *Upper floret 0.68−0.72 times the length of the lower floret*. Lemma of upper floret *hyaline to membranous*; smooth; dull; with flat margins; with margins of the same texture as the body; without basal modifications; not differentiated at the apex. Stamens 3. C−3. XyMs+.

Remarks: *Triscenia* is a monotypic genus occurring in mountainous and riparian areas of Cuba. General form of the culm and inflorescence is unusual. The internodes are compacted and not elongate, therefore the leaves

originate from the base of the plant and the peduncle at ground level. The peduncle and main axis are relatively long, flexuous, and with few widely spaced distichous primary branches. The leaves are unusual in that the sheaths are relatively short and flared, whereas the blades are filiform and conduplicate. Important characteristics of the spikelet include absence of the lower palea, hyaline to membranous texture of the upper floret, and the flat margins of the upper lemma. These characteristics indicated that *Triscenia* is closely allied with *Reynaudia, Rhynchelythrum* and *Hymenachne*.

THRASYA Kunth, Nov. Gen. Sp. 1:120. 1816. TYPE SPECIES: *T. paspaloides* Kunth.

Tylothrasya Doell in Mart., Fl. Bras. 2:295. 1877. TYPE SPECIES: *T. petrosa* (Trin.) Doell.

Plants perennial. Internodes hollow; neither viscid nor glaucous. Ligule a membrane. Inflorescence a panicle or a raceme. Main axis straight; with secund primary branches. Primary branches appressed to the main axis; with appressed secondary branches; with secund spikelets. Rachis terminating in a spikelet, or in an unmodified naked point. Pedicels present; discoid; perpendicular with the spikelet base; flat or convex. Disarticulation at the spikelet base. Callus differentiated or not differentiated; prolonged or not prolonged into a stipe; not flared to form a discoid receptacle. Cleistogamous inflorescence absent. Spikelets solitary or paired; adaxial; dorsiventrally compressed to planoconvex. First glume fused with the callus to form a cuplike structure or not fused with the callus; present or absent; 0.05 − 0.7 times spikelet length; not encircling the spikelet base; muticous. Rachilla not pronounced below the second glume; not pronounced between the florets (slightly developed in some species, 0.1 − 0.2 mm long). Second glume present; 0.7 − 1.2 times spikelet length; neither saccate nor gibbose; 3, 5, or 7-nerved (the midnerve occasionally absent); indumentum not uncinate. Lemma of lower floret membranous; with a hyaline area at the base or with the area between the central nerve and the first lateral nerve thinner in texture than the rest of the structure; *with a central longitudinal groove*; acuminate to acute; muticous. Palea of lower floret with nerves pronounced but not winged. Upper floret 0.9 − 1 times the length of the lower floret. Lemma of upper floret cartilaginous; striate or muricate; dull; with involute margins; with margins of the same texture as the body; without basal modifications; differentiated (hairy in some species) or not differentiated at the apex. Stamens 3. C − 4. XyMs-. Base chromosome number, x = 10.

Remarks: *Thrasya* is a New World genus comprising about 20 species occurring from Mexico to South America. The unusual convex pedicel apex

characteristic of *Paspalum* is clearly expressed in *Thrasya*. In addition, the winged rachis extends beyond the terminal spikelet in some taxa of both genera. *Paspalum* and *Thrasya* are clearly, closely related but differ in many significant characteristics. *Thrasyopsis* Parodi, a South American genus of two species, differs from *Thrasya* only in the number of nerves on the second glume, and the distinction between these genera is rather arbitrary. Important morphological features expressed in *Thrasya* are discussed in the following paragraphs.

The inflorescence is reduced to a single racemose, winged branch. As a result, the inflorescence main axis is winged with secund spikelets. In some taxa, the wing is pronounced and tends to close around the spikelets, which occur on short pedicels. In most species, the base of the main axis is differentiated by the presence of hairs and/or bracts. These bracts may be only 0.3 mm long and probably represent remnants of reduced inflorescence branches. Arrangement of the spikelets on the rachis is unusual in *Thrasya*. For a few species (e.g., *T. cultrata* Nees), the spikelets are obviously paired and occur in long-short pedicel combinations, and the pairs alternate on one side of the rachis. In most species, the spikelets appear solitary, form a single row on one side of the rachis, and appear to alternate between abaxial and adaxial orientation. Various authors have used this feature as a key diagnostic character for *Thrasya*. Our observations of the species appearing to possess solitary spikelets, have shown that the spikelets are actually paired, the pedicels are fused to the rachis midrib, and the spikelet pairs alternate on one side of the rachis. Therefore, the spikelets do not alternate between adaxial and abaxial orientation.

A callus at the spikelet base occurs in *Thrasya*, but is poorly developed in most species. It is well-developed in *T. petrosa* (Trin.) Chase where it is about 0.9 mm long, white, glabrous, and bulbose. In some specimens the callus is similar to that found in *Eriochloa*. The first glume of *Thrasya* is present or absent. In *T. cultrata*, the first glume of the lower subsessile spikelet is lanceolate and about 3 mm long, whereas on the pedicellate spikelet it is ovate, rounded at the apex, and about 0.8 mm long. Therefore spikelet heteromorphism, a rare characteristic in the Paniceae, occurs in this genus. Morphology of the lower floret is taxonomically significant in *Thrasya*. The lower lemma is relatively dense in texture and has a central longitudinal groove, and this central area is hyaline or relatively thin in texture. At maturity, the lower lemma splits along the central groove. Presence of a centrally grooved lower lemma associated with reduced texture occurs elsewhere in the Paniceae and is correlated with the presence of well-developed stamens in the lower floret. Such well developed stamens are characteristic of *Thrasya*. The palea of the lower floret is hyaline in the

central area but has indurate, pronounced marginal nerves.

ACKNOWLEDGMENTS

Appreciation is gratefully extended to John Wiersema and Joseph Kirkbride for making suggestions to improve the wording of the manuscript. Vittoria Hess provided technical assistance in all aspects and data collection, storage, analysis, and presentation. Much needed assistance in preparing the parallel Spanish character list was provided by Elizabeth Manrique F. and Miguel A. Carranza P.

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